

## **REMARKS**

In the pending Office Action the Examiner has objected to claim 4; rejected claims 1, 7, 14, and 26-30 under 35 U.S.C. § 102(b) as being anticipated by Younan et al.<sup>1</sup> (H. Younan et al., "Improvement of 155 Wright Etch and Its Application in Failure Analysis of In-Line QBD Failure in Wafer Fabrication," *ICSE2002 Proceedings*, 2002, pages 188-190, hereafter "Article V"); rejected claims 1, 3-5, 8-13, 15, and 22-25 under 35 U.S.C. § 103(a) over Y.N. Hua et al. (Y.N. Hua et al., "Studies on Stacking Faults & Crystalline Defects in Fabrication Silicon Wafer Substrates," *ICSE '98 Proceedings*, November 1998, pages 1-8, hereafter "Article U") ; rejected claims 16, 17, and 20 under 35 U.S.C. 103(a) over Article U in view of Yasuo (Japanese Publication No. 11-054579, here after "Yasuo"); and rejected claim 31 in over Article V in view of Article U. The Examiner indicated that claims 2, 6, 18, 19, and 21 would be allowable if rewritten in independent form. Claims 1-5 and 7 have been cancelled. Claims 6, 8, 9, 14, 23, 25, and 26 have been amended and new claims 32-34 have been added. Claims 6 and 8-34 are pending. Applicants thank the Examiner for the indication of allowable material, but respectfully traverse the rejections.

### **Regarding the Amendments**

Claim 2, 4, and 5 have been rewritten in independent form as new claims 32-34, respectively. Claim 6 has been amended only to correct its dependency. Claim 14 has been amended to correct a clerical error. Claims 8, 9, 23, 25 and 26 have been amended to more clearly set forth the nature of the inventions. Support for the

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<sup>1</sup> Applicants assume the reference cited in the PTO-892 form which accompanies the pending Office Action incorrectly identifies the source and year of the article referenced by the Examiner. The correct citation is presented in the remarks.

amendments to claims 8 and 25 can be found in the specifications at, for example, page 25, lines 25-35, and Figure 13 described therewith. Support for the amendments to claims 9, 23, and 26 can be found in the specifications at, for example, page 10, lines 16-page 11, line 2, and Figures 1-4.

Regarding the objection with respect to claim 4

The Examiner objected to claim 4 due to informalities. Office Action at 2. Claim 4 has been cancelled, rendering the Examiner's objection moot.

Regarding the rejection under § 102(b) as being anticipated by Article V

The Examiner has rejected claims 1, 7, 14, and 26-30 under § 102(b) as being anticipated by Article V. Claims 1 and 7 have been cancelled rendering the rejection with regard to these claims moot.

In order to support a rejection under 35 U.S.C. § 102, each and every element of each of the claim in issue must be found, either expressly described or under principles of inherency, in that single reference. Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the ... claim." See M.P.E.P. § 2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1126, 1236, 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989). Applicants respectfully traverse the rejection, as the cited reference does not teach each and every element of independent claim 26.

Claim 26 recites a combination which includes "a first device to remove with a chemical solution a film. . . so as to expose a crystal surface of the semiconductor wafer without being cleaved," and "a second device to selectively remove a surface layer . . . by selectively etching." Emphasis added. In contrast, Article V discloses taking "two samples" are taken "from the affected wafer as the good site . . . and the

bad site,” prior to etching with the Wright etch. Page 189, 2<sup>nd</sup> paragraph. In the cited reference, the samples are taken, i.e. cleaved from the test wafer. Therefore, Article V does not disclose each and every element of claim 26. Claim 26 is therefore allowable over Article V.

Given the above, independent claim 26 is not anticipated by Article V. Claims 27-30 depend from claim 26, and are therefore allowable at least by virtue of their dependency.

Claim 14 depends from claim 9. Claim 9, although of different scope recites a limitation similar to that discussed above with respect to claim 26. Dependent claim 14 is thus allowable for at least the reasons discussed above with respect to claim 26.

Applicants respectfully request the Examiner to reconsider and withdraw the rejection of claims 14 and 26-30 under 35 U.S.C. 102(b).

#### Regarding the rejection under § 103(a) over Article U

The Examiner has rejected claims 1, 3-5, 8-13, 15, and 22-25 under 35 U.S.C. § 103(a) over Article U. Claims 1 and 3-5 have been cancelled, rendering the rejection with respect to these claims moot.

To establish a *prima facie* case of obviousness, three basic criteria must be satisfied. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine references. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all of the claim elements. See M.P.E.P. § 2143. Moreover, the requisite teaching or suggestion to make the claimed combination and the reasonable

expectation of success must both be found in the prior art, not in Applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). See M.P.E.P. § 706.02(j). Applicants respectfully traverse the rejections under § 103(a) as each and every element of the rejected claims is not disclosed by the prior art.

Independent claim 8 recites “treating the semiconductor wafer in a first solution including at least one of  $\text{NH}_4\text{F}$  and HF whose concentration is equal to or more than 33% and less than 49%.” In contrast, Article U discloses “HF(49%) deprocessing,” at page 1, paragraph 2. Claim 8 clearly recites using HF with a concentration less than that disclosed by the prior art. Article U therefore does not disclose each and every element of claim 8, and claim 8 is allowable over Article U for at least this reason.

Independent claim 9 recites a method including, for example, “selectively removing a surface layer of the semiconductor wafer by selective etching without cleavage to bring the crystal defect into view.” Emphasis added. In contrast, Article U discloses that “all samples were cut into a quarter wafer using a diamond scribe, or cut the sample as requested,” prior to any etching Page 1, column 2, paragraphs 1-3. The cited reference thus teaches cleavage of samples prior to etching, and thus does not disclose each and every element of claim 9. For at least this reason, claim 9 is allowable over Article U.

Claim 23 recites a method including, for example, “quantitatively evaluating the crystal defect over the entire semiconductor wafer.” Emphasis added. As stated previously, Article U discloses cleavage of samples prior to selective etching. Page 1, column 2, paragraphs 1-3. Since the samples are cleaved from a test wafer, the cited reference can not disclose evaluating the crystal defect over the entire wafer. Article U

does not disclose each and every element recited in claim 23. For at least this reason, claim 23 is allowable over Article U.

Given the above, independent claims 8, 9, and 23 are allowable over the cited prior art. Applicants therefore request reconsideration and withdrawal of the Examiner's rejection of claims 8, 9, and 23, under 35 U.S.C. § 103(a) and the timely allowance of claim 8, 9, and 23.

Regarding the rejection under 35 U.S.C. § 103(a) over Article U in view of Yasuo

The Examiner rejected claims 16, 17, and 20 under § 103(a) over Article U in view of Yasuo. Applicants respectfully traverse the rejection.

Claim 16 recites "an inspection method," including "a reference area including a defect-free device pattern on the semiconductor wafer . . . detecting the crystal defect by obtaining an image to be evaluated . . . and comparing the image to be evaluated with the reference image." The Examiner admits that Article U fails to teach such an method. Office Action at 6. However, the Examiner further cites Yasuo, and contends that "Yasuo invents a method where a defect-free layer in the sample is created and used to compare to a sample with defects." Office Action at 6. Applicants disagree.

Yasuo does not teach a defect-free device pattern in a reference area to be compared to a sample with defects. Yasuo is drawn to a method for "evaluating . . . pit density by a laser foreign matter detecting device." Abstract. Yasuo discloses a method of analysis using oxygen precipitates on an otherwise bare wafer surface (Figures A, B, and C), where the oxygen precipitates are selectively etched to "greatly change the width of pits," so as to allow analysis by "a laser foreign matter detecting device . . . in [a] defective distribution on the entire wafer." Abstract. Yasuo therefore

does not detect defects in a reference area and a sample area. Accordingly, Yasuo can not teach "a reference area including a defect-free device pattern on the semiconductor wafer . . . detecting the crystal defect by obtaining an image to be evaluated . . . and comparing the image to be evaluated with the reference image," as recited in claim 16.

Although of different scope, claims 17 and 20 recite limitations similar to that discussed above with respect to claim 16. Thus, neither Article U or Yasuo, taken alone or in combination, teach each and every element of claims 16, 17, and 20. Accordingly, no *prima facie* case of obviousness has been established. Applicants therefore respectfully request reconsideration by the Examiner and withdrawal the rejection of claims 16, 17, and 20 under 35 U.S.C. § 103(a) over Article U in view of Yasuo.

Regarding the rejection of under 35 U.S.C. § 103(a) over Article V in view of Article U

The Examiner has rejected claim 31 under 35 U.S.C. § 103(a) over Article V in view of Article U. For the reasons given above, independent claim 26 is allowable. Claim 31 depends from independent claim 26, and for at least this reason, claim 31 is also allowable.

Conclusion

For at least the reasons presented above, Applicants respectfully submit that independent claims 8, 9, 23 and 26 are allowable over the art of record. Further, claims 10-22, 24-25 and 27-31 respectively depend from claims 9, 23, and 26. Claims 10-22, 24-25 and 27-31 are allowable at least by virtue of such dependence. Therefore, all pending claims 6 and 8-34 are allowable.

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

*Richard V. Burgujian*

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By: *Robert J. Elmore, Jr. #27,432*

Richard V. Burgujian  
Reg. No. 31,744